CLAIMS

What is claimed is:

1. A method of cooling a steam turbine having internal moving components to a predetermined temperature, wherein the steam turbine comprises injection points, the method which comprises the steps of:

(a) stopping the flow of steam;

(b) introducing a flow of nitrogen to the turbine until the turbine reaches the predetermined temperature while controlling the flow of nitrogen at the injection points to prevent damage to the moving components of the turbine by achieving uniform cooling of the internal moving components; and

(c) stopping the flow of nitrogen.

2. The method of Claim 1, wherein the injection points comprise a main steam inlet piping connected to the turbine and a cold reheat line connected to the turbine such that a flow of steam first moves from the main steam inlet piping to the turbine and then the flow of steam moves from the turbine to the cold reheat line during operation, and wherein the flow of nitrogen moves from the main steam inlet piping to the turbine and then the flow of nitrogen moves from the turbine to the cold reheat line during Step (b).

3. The method of Claim 1, wherein the injection points comprise a main steam inlet piping connected to the turbine and a cold reheat line connected to the turbine such that a flow of steam first moves from the main steam inlet piping to the turbine and then the flow of steam moves from the turbine to the cold reheat line during operation, and wherein the flow of nitrogen moves from the cold reheat line to the

turbine and then the flow of nitrogen moves from the turbine to the main steam inlet piping during Step (b).

4. The method of Claim 1, wherein the injection points comprise a main steam inlet piping connected to the turbine and a cold reheat line connected to the turbine such that a flow of steam first moves from the main steam inlet piping to the turbine and then the flow of steam moves from the turbine to the cold reheat line during operation, and wherein the steam turbine further comprises a hot reheat line connected to the turbine and a condenser vacuum relief line connected to the turbine such that a flow of steam first moves from the hot reheat line to the turbine and then the flow of steam moves from the turbine to the condenser vacuum relief line during operation, wherein the flow of nitrogen in also moves from the hot reheat line to the turbine and then the flow of nitrogen moves from the turbine to the condenser vacuum relief line during Step (b).

5. The method of Claim 2, wherein the steam turbine further comprises a hot reheat line connected to the turbine and a condenser vacuum relief line connected to the turbine such that a flow of steam first moves from the hot reheat line to the turbine and then the flow of steam moves from the turbine to the condenser vacuum relief line during operation, wherein the flow of nitrogen in also moves from the hot reheat line to the turbine and then the flow of nitrogen moves from the turbine to the condenser vacuum relief line during Step (b).

6. The method of Claim 3, wherein the steam turbine further comprises a hot reheat line connected to the turbine and a condenser vacuum relief line connected to the turbine such that a flow of steam first moves from the hot reheat line to the turbine and then the flow of steam moves from the turbine to the condenser vacuum

relief line during operation, wherein the flow of nitrogen in also moves from the hot reheat line to the turbine and then the flow of nitrogen moves from the turbine to the condenser vacuum relief line during Step (b).

7. The method of Claim 2, wherein the main steam inlet piping comprises a main steam inlet piping drain line connected to the main steam inlet piping, the method wherein the flow of nitrogen moves from the main steam inlet piping drain line to the main steam inlet piping during Step (b).

8. The method of Claim 7, wherein the flow of nitrogen also moves from the hot reheat line to the turbine during Step (b).

9. The method of Claim 3 wherein the turbine further comprises a cold reheat drain pots connected to the cold reheat line, the method wherein the flow of nitrogen moves through the cold reheat drain pots to the cold reheat line in Step (b).

10. The method of Claim 3 wherein the turbine further comprises a cold reheat drain pots connected to the cold reheat line, the method wherein some of the flow of nitrogen moves through the cold reheat drain pots to the cold reheat line in Step (b).

11. The method of Claim 3 wherein the turbine further comprises a cold reheat drain pots connected to the cold reheat line, the method wherein the flow of nitrogen moves through the cold reheat line to the cold reheat drain pots in Step (b).

12. The method of Claim 1, wherein the injection points comprise a main steam inlet piping connected to the turbine and a cold reheat line connected to the turbine such that a flow of steam first moves from the main steam inlet piping to the turbine

and then the flow of steam moves from the turbine to the cold reheat line during operation, the method which further comprises the step of controlling the flow of nitrogen during Step (b) with a computer control system.

13. The method of Claim 1, wherein the injection points comprise a main steam inlet piping connected to the turbine and a cold reheat line connected to the turbine such that a flow of steam first moves from the main steam inlet piping to the turbine and then the flow of steam moves from the turbine to the cold reheat line during operation, the method which further comprises introducing a heated flow of nitrogen to the turbine to preheat the internal moving components of the turbine after Step (c).

14. A system for cooling a steam turbine to a predetermined temperature using a flow of nitrogen, the system comprising:

a steam turbine;

a main steam inlet piping connected to the turbine;

a cold reheat line connected to the turbine; and

a control station for controlling the flow of nitrogen to prevent damage to the moving components or the turbine;

wherein the steam turbine, the main steam inlet piping, and the cold reheat line are adapted to accommodate the flow of nitrogen.

15. The system of Claim 14 which further comprises:

a hot reheat line connected to the turbine; and

a condenser vacuum relief line connected to the turbine;

wherein the hot reheat line and the condenser vacuum relief are adapted to accommodate the flow of nitrogen.

16. The system of Claim 14 further comprising a main steam inlet piping drain line connected to the main steam inlet piping wherein the main steam inlet piping drain line is adapted to accommodate the flow of nitrogen.

17. The system of Claim 14 further comprising a cold reheat drain pots connected to the cold reheat line adapted to accommodate the flow of nitrogen.

18. The system of Claim 14 further comprising a computer control system wherein the computer control system is adapted to control the flow of nitrogen.

19. The System of Claim 14 wherein the predetermined temperature is less than about 200°F.

20. A method of providing a more efficient and cost effective method of operating a power plant, the method which comprises the Step of reducing downtime by cooling each steam turbine using the method of Claim 1.